

First records of the families Metapelmatidae and Neanastatidae (Hymenoptera, Chalcidoidea) in Saudi Arabia

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Abstract. The families Metapelmatidae and Neanastatidae (Hymenoptera, Chalcidoidea) are recorded for the first time from Saudi Arabia based on the presence of *Metapelma mirabile* Brues, 1906 and *Neanastatus africanus* Ferrière, 1938, respectively.

Keywords. Biodiversity, ecosystem service, *Metapelma*, *Neanastatus*, parasitoids, new records

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INTRODUCTION

Chalcid wasps (Hymenoptera, Chalcidoidea) are the most important and successful group of parasitoids that have been used in biological control programs. Over 800 different species have been associated with biocontrol programmes in some manner (Noyes 2019). These parasitic wasps provide ecosystem services by helping to control insect pest populations in natural conditions and thus help to minimize the injudicious use of pesticides that may affect nature adversely.

Until recently, Chalcidoidea was classified into 19 families (Noyes 2019), but Burks et al. (2022) proposed a new major higher-level reclassification of the superfamily based primarily on next-generation molecular analysis. Cruaud et al. (2024) provided a better molecular support for Burks et al. (2022). As part of the reclassification by Burks et al. (2022), *Metapelma* Westwood, 1835 was removed from the subfamily Neanastatinae of Eupelmidae and placed in its own family, Metapelmatidae. *Eopelma* Gibson, 1989 was also removed from Neanastatinae, and treated as *incertae sedis* regarding family placement, and the remaining two extant genera formerly classified in Neanastatinae, *Lambdobregma* Gibson, 1989 and *Neanastatus* Girault, 1913 were placed in the family Neanasatidae.

Metapelma consists of comparatively large-bodied wasps measuring 3–10 mm, and *Metapelma* species are known to attack the larvae of wood-boring coleopterans, primarily Cerambycidae and Buprestidae (Goulet and Huber 1993), whereas individuals of *Neanastatus* measure 2–8 mm and are primary parasitoids of the larvae of Cecidomyiidae (Diptera) or hyperparasitoids through other Platygastroidea (Hymenoptera), (Gibson 1989). Here, we record *Metapelma mirabile* Brues, 1906 and *Neanastatus africanus* Ferrière, 1938 for the first time from Saudi Arabia.



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METHODS

Our study is based on materials collected using Malaise traps from Asir province, Saudi Arabia. The collected specimens were first preserved in 80% ethanol and were later mounted on rectangular cards. Following the methods as described by Noyes (1982) and Anwar et al. (2020), one pair of wings and an antenna was removed and mounted on a slide to study setation and segmentation in detail. The images were taken from card-mounted specimens using a stereozoom binocular Nikon SMZ 1000 microscope. Photographic plates were prepared using Adobe Photoshop v. 7.0. The specimens were identified using available literature: Askew and Nieves-Aldrey (2017) for *N. africanus*, and Brues (1906) and van Noort (2023) for *M. mirabile*. The identified materials are deposited at the Insect Collections Department of Zoology, Aligarh Muslim

University, Aligarh, Uttar Pradesh, India.

Abbreviations for the repositories: **BMNH**, The Natural History Museum, Department of Entomology, London, England; **MPMW**, Milwaukee Public Museum, Milwaukee, Wisconsin, USA; **ZDAMU**, Insect Collections, Department of Zoology, Aligarh Muslim University, Aligarh, India.

RESULTS

Family Metapelmatidae Bouček, 1988

Metapelmatinae Bouček 1988: 547. Type genus: *Metapelma* Westwood, 1835.

Metapelmatidae; Burks et al. 2022: 74 (revised status).

Genus *Metapelma* Westwood, 1835

Metapelma Westwood, 1835: 69. Type species *Metapelma spectabilis* Westwood, by monotypy.

Remarks. The genus is recorded for the first time from Saudi Arabia based on the material collected from Asir.

Important references. Burks et al. (2022); Cao et al. (2020); Ferrière (1938); Gibson (1989); Gibson (2009); Gibson and Fusu (2009); Narendran et al. (2013); Yang (1996).

Metapelma mirabile Brues, 1906

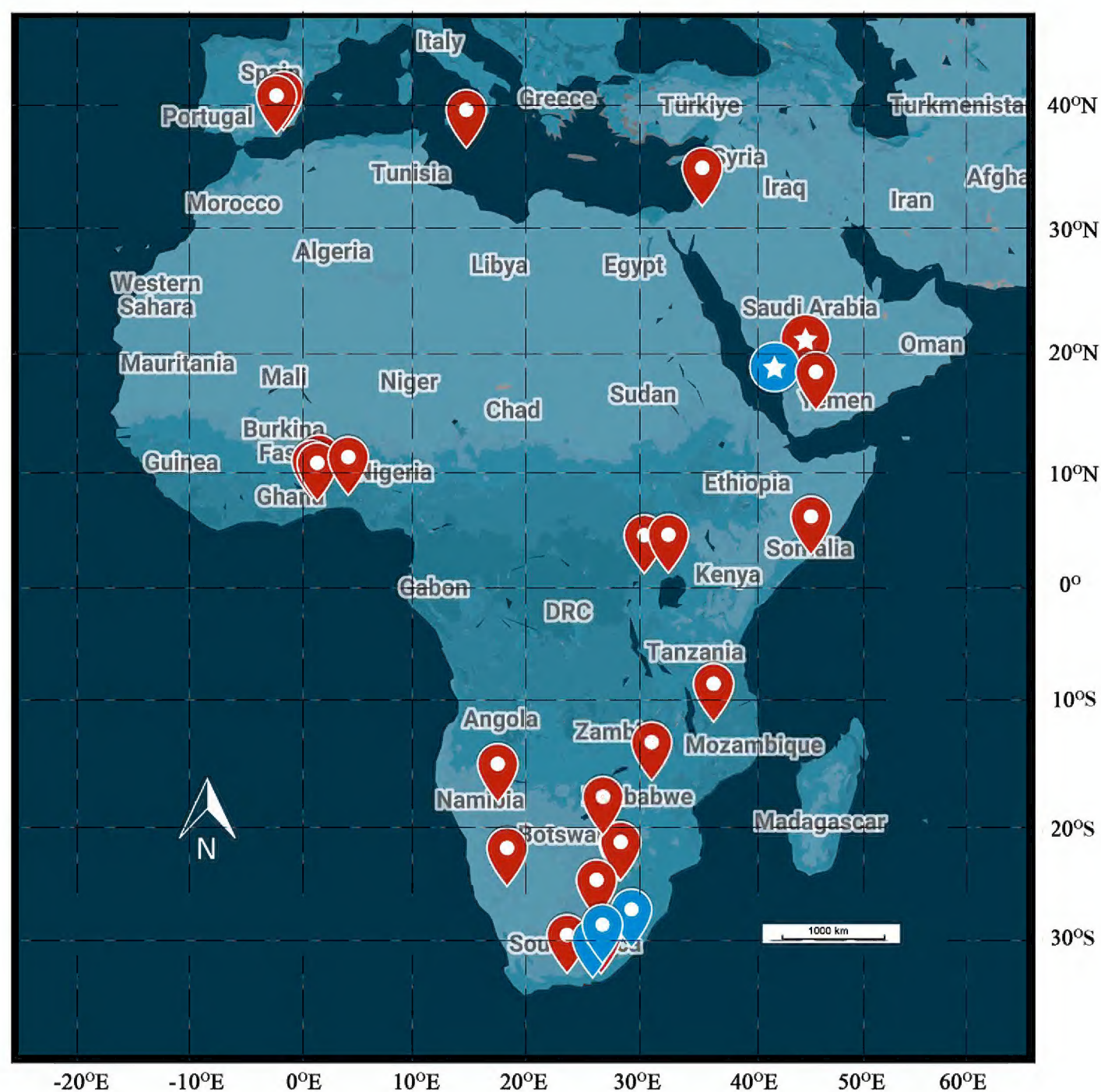
Figures 1, 2

Metapelma mirabile Brues 1906: 111, ♀, ♂. Neotype, ♀ (MPMW), South Africa, not examined.

Material examined. SAUDI ARABIA – ASIR • Abha, Hay Al-Menhal; 18°13'N, 042°30'E; 2214 m alt.; 20.XI.2013; H.A. Dawah leg.; Malaise trap; 1 ♀ on card, ZDAMU HYM.51.

Identification. *Metapelma mirabile* is a remarkable species with extremely broad, flattened metatibia (Figure 2A). The other diagnostic features of the species are: head and body dark with green-purplish reflection

Figure 1. Map showing the geographical distribution of *Metapelma mirabile* (blue balloon) and *Neanastatus africanus* (maroon balloon), and newly recorded *Metapelma mirabile* (blue star) and *Neanastatus africanus* (maroon star) in Saudi Arabia.



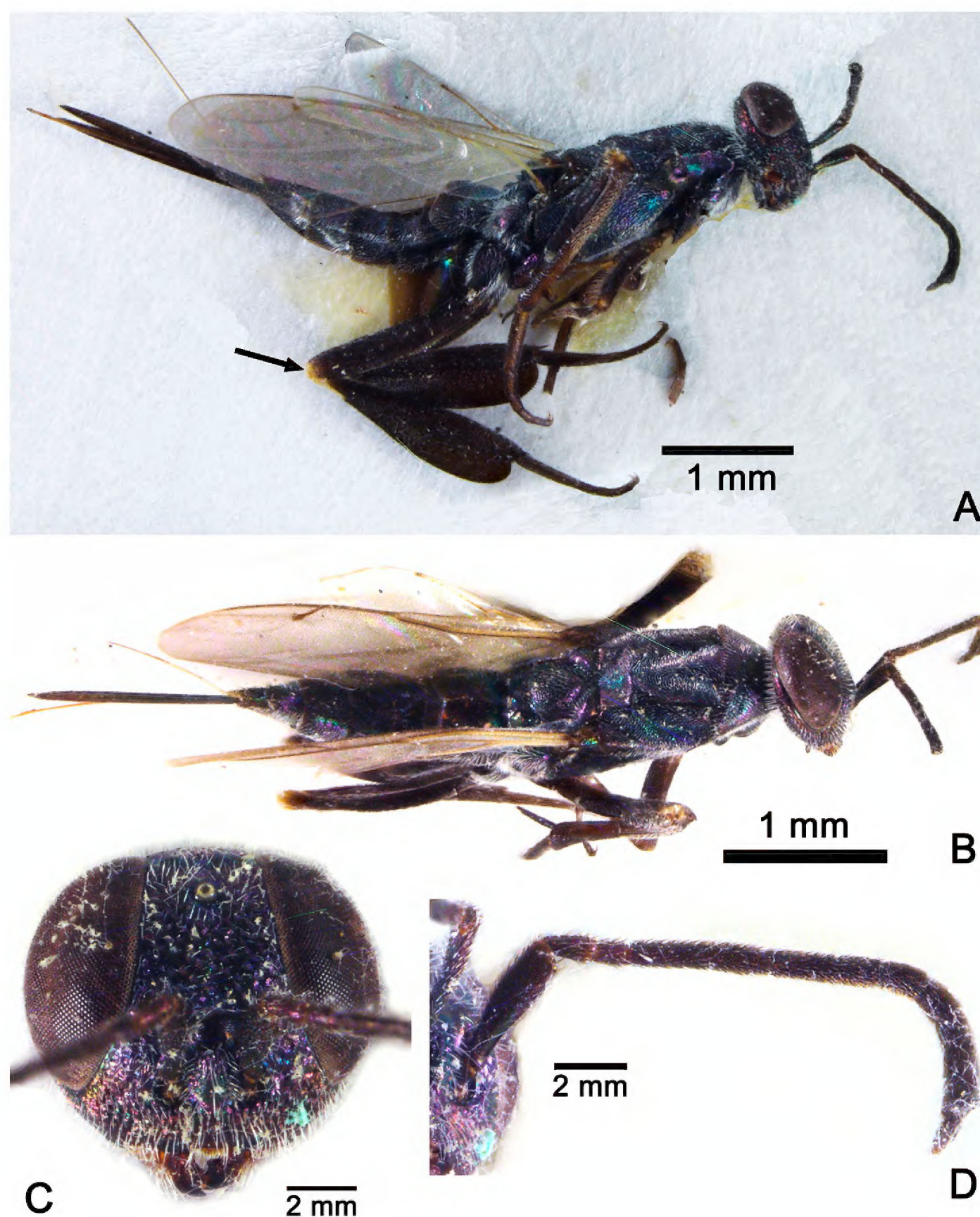


Figure 2. *Metapelma mirabile* Brues, female. **A.** Habitus, lateral. **B.** Habitus, dorsal. **C.** Head. **D.** Antenna.

(Figure 2A, B); antenna (Figure 2D) and ovipositor dark brown; legs dark brown, with dorsal base of metatibia white; white pubescence on head and body dense; head (Figure 2C) with coarse punctures; wings hyaline; fore wing in apical 4/5 uniformly setose; marginal vein subequal to postmarginal vein; exerted part of ovipositor as long as metasoma (Figure 2A).

This species was originally described from South Africa by Brues (1906) and until now has never been recorded elsewhere. We record this species for the first time from Saudi Arabia.

Host. Unknown.

Distribution. Saudi Arabia (new record), South Africa.

Family Neanastatidae Kalina, 1984

Neanastatinae Kalina 1984: 8. Type genus: *Neanastatus* Girault, 1913.

Neanastatidae; Burks et al. 2022: 76 (revised status).

Genus *Neanastatus* Girault, 1913

Neanastatus Girault 1913: 29. Type species: *Neanastatus cinctiventris* Girault, by original designation and monotypy.

Remarks. The genus is recorded for the first time from Saudi Arabia based on the material collected from Asir.

Important references. Burks et al. (2022); Ferrière (1938); Gibson (1989); Gibson (2009); Gibson and Fusu (2009); Narendran et al. (2006).

***Neanastatus africanus* Ferrière, 1938**

Figures 1, 3

Neanastatus africanus Ferrière 1938: 64, ♂, ♀. Type not designated (BMNH), South Africa, not examined.

Material examined. SAUDI ARABIA – ASIR • Abha, Medinate Al-Ameer Sultan, Hay Al-Sad; 18°17'N, 042°37'E; 2242 m alt.; 16.IX.2014; H.A. Dawah leg.; Malaise trap; 2 ♀ each on card, ZDAMU HYM.52, HYM.53.

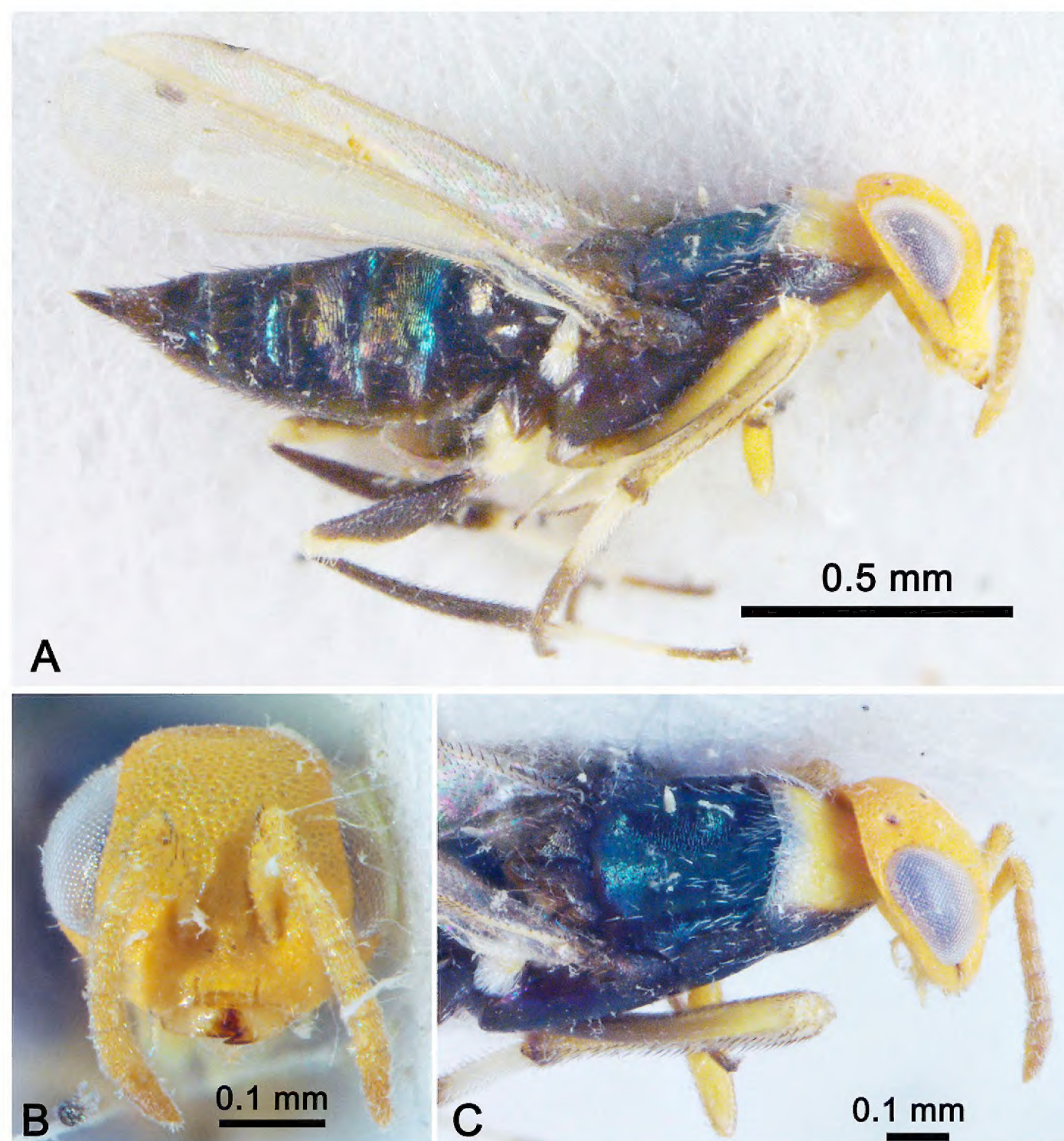
Identification. Individuals of *N. africanus* typically have a dark-brown body, with bluish-green reflection, except pronotum dorsally and on sides of propodeum; head whitish yellow (Figure 3); legs (Figure 3A) with coxae whitish yellow; fore and mid legs yellow, except first tarsal segment white and remaining segments brown; hind legs brown, except femur posteriorly yellow; metatarsus with first tarsal segment white and remaining segments brown; head (Figure 3B) with coarse punctures; setae on mesosoma white, but dark brown on metasoma; mesotibial spur longer than first tarsal segment; ovipositor slightly exerted at apex of gaster (Figure 3A).

This species was previously recorded from several African nations and southern Europe as cited below, and we record it for the first time from Saudi Arabia.

Host. Gall of *Asphondylia* sp. on *Sesamum* (Ferrière 1938).

Distribution. Botswana (Fusu et al. 2015), Jordan (Fusu et al. 2015), Malta (Mifsud and Askew 2019), Mozambique (Fusu et al. 2015), Namibia (Fusu et al. 2015), Nigeria (Herting 1978), Saudi Arabia (new record), Somalia (Fusu et al. 2015), South Africa, Spain (Askew and Nieves-Aldrey 2017), Togo (Fusu et al. 2015), Uganda, Yemen (Fusu et al. 2015), Zimbabwe (Fusu et al. 2015).

Figure 3. *Neanastatus africanus* Ferrière, female. **A.** Habitus, lateral. **B.** Head with antenna. **C.** Mesosoma with head.



DISCUSSION

The biodiversity of Saudi Arabia is quite impressive and includes many species that are endemic to the Kingdom. But, due to the lack of taxonomic expertise and interest, the entomofauna of the region is less studied. We have attempted to collect chalcid samples on a regular basis and to identify them so that the species richness of the region is better known. The genera *Metapelma* and *Neanastatus*, currently representing the families Metapelmatidae and Neanastatidae, respectively, are found in almost all zoogeographic zones except Antarctica; they are most abundant in the Afrotropical, Oriental and Palaearctic regions. As a result of our study, species representing these genera and families are recorded for the first time from Saudi Arabia. Nevertheless, species richness of the region is far more diverse and will eventually increase subject to collection of these parasitic wasps in a timely manner.

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ADDITIONAL INFORMATION

Conflict of interest

The authors declare that no competing interests exist.

Ethical statement

No ethical statement is reported.

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Author contributions

Conceptualization: FRK, PTA. Formal analysis: SSA. Funding acquisition: FRK. Investigation: SUU. Methodology: PTA. Resources: SSA. Visualization: SSA. Writing – original draft: SUU. Writing – review and editing: SKA, PTA.


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Data availability

All data that support the findings of this study are available in the main text and available in the Insect Collections of the Department of Zoology, Aligarh Muslim University, Aligarh, India.

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